[Background text fragments from image collage:]

...resentations of a area, emphasizing the subjective aspects of mapping and its use as a tool for control. Community Satellites give communities the ability to create maps with the information they are interested in displaying. The technique was developed by Grassroots Mapping (part of The Public Lab).

THE PUBLIC LAB

The Public Laboratory for Open Technology and Science (Public Lab) is non-profit organization dedicated to building a community interested in developing open-source tools for environmental exploration and investigation. The Public Lab seeks to democratize inexpensive Do-It-yourself techniques, like Balloon Mapping, to generate knowledge about community environmental health. Their tools are meant to provide a foundation for people interested in locally-relevant outcomes and increase the ability of communities to identify environmental concerns. To facilitate these goals, Public Lab also provides online and offline training.

OTHER ALTERNATIVES TO THE BALLOON

The Public Lab offers a Kite Mapping Set to complement the Balloon Mapping Kit. It provides for a cheaper alternative to helium if there are good wind conditions. The Kite Mapping set provides for two kites with ribbon and fuzzy tail that serve as stabilizers. At the time of the project, using a kite was not an option because of wind conditions, high-tension cables and flying Ugandan Cranes. Renting a small plane to fly over the Craft Market area and take pictures was also a possibility available in Kampala, but was not explored.

AFFORDABILITY

The Public Lab website explains that a latex balloon can withstand around 5-12 inflations if the balloon is minimally filled (40-50 cu. ft.), 3-5 if it is medium inflated (60-70 cu. ft.), and 2-3 inflations if the balloon is filled all the way to 80-85 cu. ft. Minimally filling the balloon would yield between 6-7 flights per 8.5 cubic meter tank. The cylinder can be kept up to 6 months.

For the Balloon Mapping sessions in the Craft Market, we inflated the latex balloon to its medium size so it could support the camera with the least wiggle. Dividing the up-front cost of Balloon Mapping (USh 3,431,827) by 4 flights per tank, each session would cost USh 857,936 or $333.44.

Following the Ugandan National Household Survey of 2009/2010 the country-wide-average for monthly household income was USh 303,707 or around $116.62. However, a household in rural Northern Uganda makes on average USh 117,200 a month, which converts into $45. This makes Balloon Mapping unaccessible to most individuals. However, it is not expensive for a group of Ugandans to afford if they follow a SACCO-like savings model.

SACCO (Savings and Credit Cooperative) is a credit union ...with a common tie agree...

THEIR COSTS

...r set to get acquainted with ...include a camera. The least ...with continuous shooting mode ...ory card in either Nakumatt or ...e to USh 308,760 or $120.00. ...d to stabilize the camera. A ...a plastic juice bottle. A Wijax ...

PUBLIC LAB
COMBINING PARTICIPATORY MAPPING WITH AERIAL BALLOON MAPPING

In 2013, citizens from a craft market in a slum area near Kampala worked with María Lamadrid, a member of the open source environmental monitoring community Public Lab, to create a high-resolution map of their market using simple balloon mapping techniques.[1]

This project shows how citizens can use simple, relatively affordable technology to create aerial maps that show how an area is used and describe the local community's practices.

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1   Maria Lamadrid, "Tool for Stalling: Mapping", May 15, 2013, accessed September 10, 2015, *http://publiclab.org/notes/ mlamadrid/05-15-2013/tool-for-stalling-mapping*

Although the project was small in scale, the women from the market were able to use the data they collected to campaign against their eviction from the area and achieve some successes in influencing the Ugandan government.

CONTEXT

In late 2012, government agencies attempted to evict local residents from the craft market, stating that their lease had expired. The land had been designated for apartments owned by foreign investors, and the government did not provide support to relocate the residents to another area. Existing maps (such as satellite images) did not document the 800 people who worked in the market, or the type of activity that was taking place in the area.

The community used a simple balloon mapping technique developed by Public Lab that involves attaching a digital camera to a helium balloon, taking a series of pictures at regular intervals and then creating a map by joining or 'stitching' the photos together.

Public Laboratory's balloon mapping kit

Public Laboratory also sells balloon mapping kits with the main components needed (apart from the camera and the helium) for around USD 100.[2]

The community built the balloon, added a camera and created a map of the area, using Public Lab's MapKnitter[3] platform to combine the photos that had been taken.

> *"The members of [the market] and I could have control over exactly what got photographed and to what resolution by winding and unwinding the balloon closer to the ground. If already in stock, the balloon takes little time to set up, which meant that in the unforeseen event of an eviction near the market, we could spring the balloon near the site and photograph the event."*
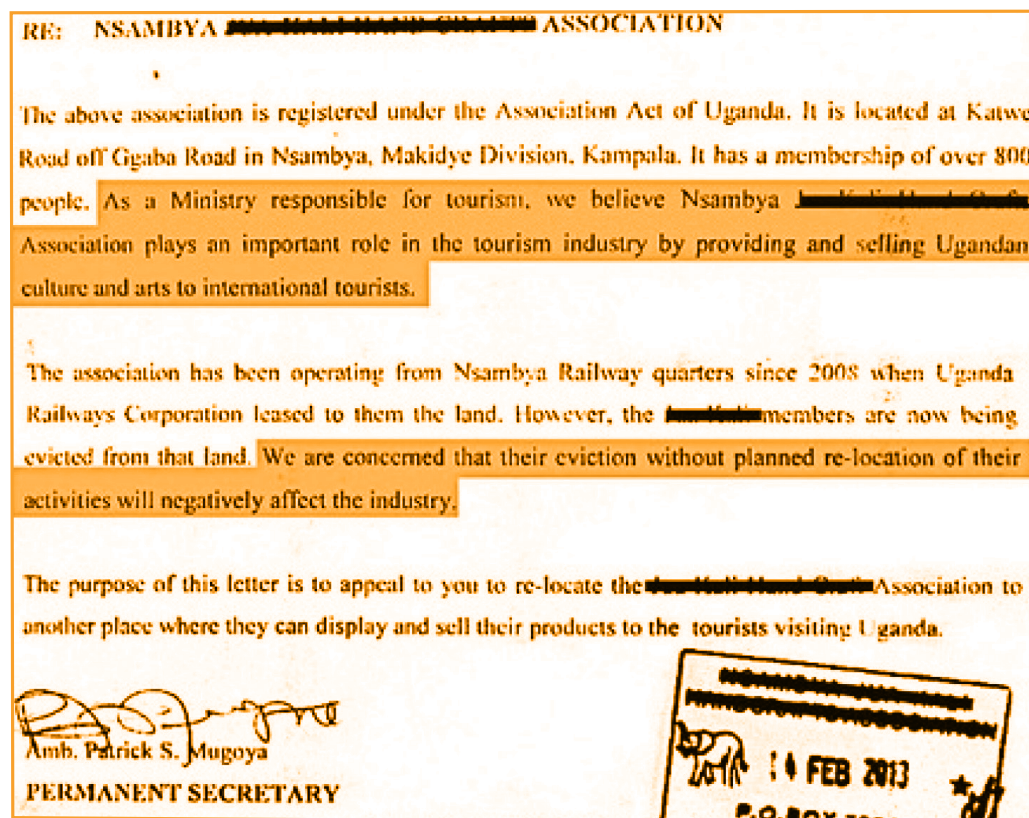
2 According to Lamadrid, helium is one of the main expenses, with one cylinder for seven mapping sessions costing around $1,300.

3 http://mapknitter.org/

This balloon mapping technique is an innovative addition to an important type of citizen-generated data technique: "participatory" (or "community-based") mapping. Participatory mapping shows how the area is actually being used, compares it with "official" maps, and uses the information to claim communities' rights to land. In this case, the map was combined with evidence from members of the community such as stories about activity in the market, to build up a picture of how the area was used.

IMPACT

The map was created to prevent the eviction from taking place immediately and build support for the residents' case–that the craft market was valuable in terms of both trade and tourism. In response, local authorities issued a court injunction prohibiting the eviction for a one-month period. Residents also sent the map to several different government agencies. The Ministry of Tourism responded by sending a team of people to evaluate the market's value to the tourism industry, and wrote a letter to the Ministry of Land pleading their case. This stalled the eviction for two extra weeks.

RE: NSAMBYA ███████████ ASSOCIATION

The above association is registered under the Association Act of Uganda. It is located at Katwe Road off Ggaba Road in Nsambya, Makidye Division, Kampala. It has a membership of over 800 people. As a Ministry responsible for tourism, we believe Nsambya ███████████ Association plays an important role in the tourism industry by providing and selling Ugandan culture and arts to international tourists.

The association has been operating from Nsambya Railway quarters since 2008 when Uganda Railways Corporation leased to them the land. However, the ███████ members are now being evicted from that land. We are concerned that their eviction without planned re-location of their activities will negatively affect the industry.

The purpose of this letter is to appeal to you to re-locate the ███████████ Association to another place where they can display and sell their products to the tourists visiting Uganda.

Amb. Patrick S. Mugoya
PERMANENT SECRETARY

14 FEB 2013
P.O.BOX ████

Letter from the Ministry of Tourism

After the authorities evicted residents from the area in February 2013, the residents created another map showing the situation before and after the area was cleared, in an attempt to gain support from the government for the market to be relocated.

Finally, the data was also added to the global mapping site OpenStreetMap, creating an accurate record of the area that could be accessed by others.

This type of project shows one way in which citizens can organize to collect data and use it as a counterpart to official data. Although these initiatives are always small in scale, they allow citizens to express their views about things that are important to them, increasing the amount of data that's available.

The market before and after eviction

DataShift is a multi-stakeholder, demand-driven initiative that builds the capacity and confidence of civil society to produce and use citizen-generated data to monitor sustainable development progress, demand accountability and campaign for transformative change. Ultimately, our vision is a world where people-powered accountability drives progress on sustainable development

DataShift is an initiative of CIVICUS, in partnership with the engine room and Wingu. For more information, visit **www.thedatashift.org** or contact **datashift@civicus.org**.